

action of moving two fingers on one hand across the touchpad. Differences among user actions may be tracked and distinguished by an embodiment using the differing output signals generated by the input device for the different user actions. If two user actions are deemed to be equivalent to each other, then a mapping of input signals can be provided for each other. One exemplary mapping compares one set of input signals generated from one user action against either an idealized template of signals or a second set of input signals generated from a second equivalent user action. For example if a scan of one finger across the touchpad is deemed to be equivalent to a scan of two fingers across the touchpad in the same general direction, then the signals generated for the first scan by the touchpad may be compared against the signals generated for the second scan. A mapping algorithm may be applied to attempt to correlate the two scans against each other.

[0037] With some general features of an embodiment described, a description of elements in an embodiment in an electronic device are provided, which is followed by details on specific features of embodiments.

[0038] Referring to FIG. 1, an electronic device for receiving electronic communications in accordance with an embodiment of the disclosure is indicated generally at 10. In the present embodiment, electronic device 10 is based on a computing platform having exemplary functionality of an enhanced personal digital assistant such as cellphone, e-mail, photographic and media playing features. It is, however, to be understood that electronic device 10 can be based on construction design and functionality of other electronic devices, such as smart telephones, desktop computers, pagers or laptops having telephony equipment. In a present embodiment, electronic device 10 includes a housing 12, a display 14 (which may be a liquid crystal display or LCD), speaker 16, a light emitting diode (LED) indicator 18, a trackball 20, a trackwheel (not shown), an ESC ("escape") key 22, keys 24A, touchpad 24B, a telephone headset comprised of an ear bud 25 and a microphone 28. Trackball 20 and ESC key 22 can be inwardly depressed as a means to provide additional input signals to device 10.

[0039] It will be understood that housing 12 can be made from any suitable material as will occur to those of skill in the art and may be suitably formed to house and hold all components of device 10.

[0040] Device 10 is operable to conduct wireless telephone calls, using any known wireless phone system such as a Global System for Mobile Communications ("GSM") system, Code Division Multiple Access ("CDMA") system, Cellular Digital Packet Data ("CDPD") system and Time Division Multiple Access ("TDMA") system. Other wireless phone systems can include Bluetooth and the many forms of 802.11 wireless broadband, like 802.11a, 802.11b, 802.11g, etc. that support voice. Other embodiments include Voice over IP ("VoIP") type streaming data communications that can simulate circuit switched phone calls. Ear bud 25 can be used to listen to phone calls and other sound messages and microphone 28 can be used to speak into and input sound messages to device 10.

[0041] Various applications are provided on device 10, including email, telephone, calendar and address book applications. A graphical user interface (GUI) providing an interface to allow entries of commands to activate these applications is provided on display 14 through a series of icons 26. Shown are calendar icon 26A, telephone icon 26B, email icon

26C and address book icon 26D. Such applications can be selected and activated using the touchpad 24B and/or the trackball 20. Further detail on selected applications is provided below.

[0042] Keys 24A provide one or more distinct, fixed input keys for device 10. Typically, they may include at least part of keys in an alphanumeric character set. Touchpad 24B may be configured to provide an additional set of "keys" (or input areas) to augment keys 24A. The additional set of "keys" in touchpad 24B are diagrammatically represented in FIG. 1 as circles. A value for each key in touchpad 24B may be silk screened on the surface of touchpad 24B or may have a separate feature, such as a key cap, affixed to or otherwise extending therefrom. As such, touchpad 24B can be used to present a virtual key layout on device 10.

[0043] Referring to FIG. 2, functional elements, modules, components and systems of device 10 are provided. The functional elements are generally electronic or electro-mechanical devices mounted within a housing. Many devices are also mounted on an internal printed circuit board (PCB). In particular, microprocessor 30 is provided to control and receive almost all data, transmissions, inputs and outputs related to device 10. Microprocessor 30 is shown schematically as coupled to keys 24A, touchpad 24B, display 14 and other internal devices. Microprocessor 30 controls the operation of display 14, as well as the overall operation of device 10, in response to actuation of keys 24A and keys on touchpad 24B. Exemplary microprocessors for microprocessor 30 include microprocessors in the Data 950 (trade-mark) series, the 6200 series and the PXA900 series, all available at one time from Intel Corporation.

[0044] In addition to microprocessor 30, other internal devices of device 10 include: a communication subsystem 34; a short-range communication subsystem 36; touchpad 24B; and display 14; other input/output devices including a set of auxiliary I/O devices through port 38, a serial port 40, a speaker 16 and a microphone port 32 for microphone 28; and memory devices including a flash memory 42 (which provides persistent storage of data) and random access memory (RAM) 44; clock 46 and other device subsystems (not shown). Device 10 may be a two-way radio frequency (RF) communication device having voice and data communication capabilities. In addition, device 10 may have the capability to communicate with other computer systems via the Internet.

[0045] Operating system software executed by microprocessor 30 may be stored in a computer readable medium, such as flash memory 42, but may be stored in other types of memory devices (not shown), such as read only memory (ROM) or similar storage element. In addition, system software, specific device applications, or parts thereof, may be temporarily loaded into a volatile storage medium, such as RAM 44. Communication signals received by the mobile device may also be stored to RAM 44.

[0046] Microprocessor 30, in addition to its operating system functions, enables execution of software applications on device 10. A set of software applications 48 that control basic device operations, such as voice communication module 48A and data communication module 48B, may be installed on device 10 during manufacture or downloaded thereafter.

[0047] Communication functions, including data and voice communications, are performed through communication subsystem 34 and short-range communication subsystem 36. Collectively, subsystem 34 and subsystem 36 provide a signal-level interface for all communication technologies pro-